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(71) 出願人 000122298

王子製紙株式会社

東京都中央区銀座4丁目7番5号

(71) 出願人 592034744

株式会社日本吸収体技術研究所

東京都中央区日本橋浜町2丁目26番5号

(72) 発明者 三好 智次

東京都江東区東雲1丁目10番6号 王子製

紙株式会社東雲研究センター内

(72) 発明者 工藤 洋輔

東京都江東区東雲1丁目10番6号 王子製

紙株式会社東雲研究センター内

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(54) 【発明の名称】 拭き布及びその製造方法

(57) 【要約】

【課題】 紙粉等の発生が少なく、優れた吸液性能と耐溶剤性を併せて有し、工業用ワイパーとして好適に用いられる拭き布及びその製造方法の提供。

【解決手段】 融点が異なる二成分の熱可塑性重合体からなる複合型長繊維不織布とパルプ繊維からなる紙シートが高圧水ジェット流により水交絡され、更に加熱ロールにより、加熱と加圧が施された複合不織布からなる拭き布及びその製造方法であって、該複合型長繊維は、熱可塑性重合体の第一成分がポリオレフィン系重合体で、第二成分が前記第一成分の融点より30℃以上高い融点を有する熱可塑性重合体からなり、該第一成分の融点以上で、且つ、第二成分の融点よりも15℃以上低い温度で、加熱と加圧処理され、第一成分のポリオレフィン系重合体のみが熔融し、パルプ繊維を接着固定する。

## 【特許請求の範囲】

【請求項1】 融点異なる二成分の熱可塑性重合体からなる複合型長繊維不織布とバルブ繊維からなる紙シートが高圧水ジェット流により水交絡され、更に加熱ロールにより、加熱と加圧が施された複合不織布からなる拭き布において、該複合型長繊維は、熱可塑性重合体の第一成分がポリオレフィン系重合体で、第二成分が前記第一成分の融点より30℃以上高い融点を有する熱可塑性重合体からなり、該第一成分の融点以上で、且つ、第二成分の融点よりも15℃以上低い温度で加熱と加圧処理され、第一成分のポリオレフィン系重合体のみが溶融し、バルブ繊維と接着固定されていることを特徴とする拭き布。

【請求項2】 融点異なる二成分の熱可塑性重合体からなる複合型長繊維不織布とバルブ繊維からなる紙シートを高圧水ジェット流により交絡一体化して複合不織布とし、次いで該不織布を加熱ロール間に通し、加熱と加圧を施した複合不織布からなる拭き布の製造方法において、該複合型長繊維は、熱可塑性重合体の第一成分がポリオレフィン系重合体で、第二成分が前記第一成分の融点より30℃以上高い融点を有する熱可塑性重合体からなり、該第一成分の融点以上で、且つ、第二成分の融点よりも15℃以上低い温度に設定した熱ロール間に前記複合不織布を導入して加熱と加圧処理することにより、第一成分のポリオレフィン系重合体のみを溶融させてバルブ繊維と接着固定することを特徴とする拭き布の製造方法。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、脱落繊維が少なく、吸液性能と耐溶剤性に優れた工業用ワイパー、ウェス等に用いられる拭き布及びその製造法に関する。

## 【0002】

【従来の技術】 従来より、工業用ワイパー、ウェス等に用いられる拭き布は、バルブ繊維を集積した後、合成高分子の樹脂の水性エマルジョンを接着剤として含有せしめて乾燥させた乾式バルブシートやレーヨン繊維を集積した後、レーヨン繊維相互間をゴム系接着剤で結合した不織布シート等が基材として使用されている。一般的に工業用ワイパーを用いて、溶剤に可溶なインキや油による汚れを拭き取る作業の場合、アセトン、酢酸エチル等の溶剤をワイパーに含ませてから対象物を拭き取るという作業を行う。これは、最初に拭き取りにより除去すべき対象物に溶剤を転移させ、汚れを溶解、希釈することにより、汚れ落ち性を向上させるために行うのである。

【0003】 しかしながら、乾式バルブシートやレーヨン不織布シートを用いた工業用ワイパーは、繊維脱落防止のために合成高分子の樹脂やゴム系接着剤を用いるため耐溶剤性が極めて悪いという問題がある。即ち、乾式バルブシートやレーヨン不織シートに溶剤を含ませ

た場合、溶剤が繊維の脱落防止のために用いた接着剤に浸透して、接着剤の膨潤が生じ、接着剤の固着強度が低下してしまい、その結果、拭き取り作業の際に、ワイパー表面の繊維が擦られると、繊維の脱落が生じるので、このようなものは工業用ワイパーとして不適である。一方、ポリプロピレン重合体を溶融し、ノズルから押し出すと同時に、ノズル近傍で高温、高速の空気を得られた溶融樹脂を細化し、捕集、集積した後、熱エンボスのような熱処理によって固定化したメルトブロー不織布も工業用ワイパーの基材として用いられる。このメルトブロー不織布の場合、ポリオレフィン重合体を溶融紡糸しており、繊維自体が耐溶剤性を有しているのに加えて、エンボス熱処理によって繊維間の固定を行っているため、不織布自体も十分な耐溶剤性を有している。

【0004】 ところが、ポリオレフィン重合体は、それ自身が疎水性であり、従って、メルトブロー不織布も疎水性である。そのために、水系の汚れをメルトブロー不織布で拭き取ろうとしても、はじきが生じてしまい拭き取りができない。これを改善するために、通常、メルトブロー不織布に親水性の界面活性剤を含有させ、親水化して使用している。このため、逆にメルトブロー不織布の本来備わっている親油性が低下し、結果的に、油系の汚れに対する拭き取り性が低下するという新たな欠点が生じている。

## 【0005】

【発明が解決しようとする課題】 そこで本発明者等は、かかる背景に鑑み、紙粉等の発生が少なく、十分な吸液性能と耐溶剤性を併せて有し、工業用ワイパーとして好適に用いることができるシート状のものについて種々の検討を行った。その結果、低融点成分としてのポリオレフィン系重合体と、この重合体の融点より特定の範囲だけ融点の高い熱可塑性重合体とから構成される、融点異なる二成分の熱可塑性重合体からなる複合型長繊維を支持体上に捕集、堆積してウェブを形成し、次いでこのウェブに規則的で断続的な自己融着部を設けた、いわゆる複合型長繊維のスパンボンド不織布とし、この上に、木材バルブを原料とした紙シートを積層し、次いで紙シートの上から前記不織布に貫通するように高圧水ジェット流を噴射して、バルブ繊維と複合型長繊維を水交絡させ、複合不織布シートとした後、この複合不織布シートを、高融点の熱可塑性重合体の融点より特定の範囲だけ低くした温度の熱ロールにおいて加熱と加圧の処理を行い、複合型長繊維の低融点成分の重合体のみを溶融させてバルブ繊維と固着させたものは、バルブ繊維の優れた吸水性能を維持し、接着剤を使用しなくても、ポリオレフィン樹脂によるバルブ繊維の固定が十分なされているので耐溶剤性に優れ、バルブ繊維の脱落による紙粉発生の少ない拭き布が得られることを見出し本発明を完成するに至った。

## 【0006】

【課題を解決するための手段】本発明の第一は、融点が異なる二成分の熱可塑性重合体からなる複合型長繊維不織布とパルプ繊維からなる紙シートが高圧水ジェット流により水交絡され、更に加熱ロールにより、加熱と加圧が施された複合不織布からなる拭き布において、該複合型長繊維は、熱可塑性重合体の第一成分がポリオレフィン系重合体で、第二成分が前記第一成分の融点より30℃以上高い融点を有する熱可塑性重合体からなり、該第一成分の融点以上で、且つ、第二成分の融点よりも15℃以上低い温度で加熱と加圧処理され、第一成分のポリオレフィン系重合体のみが熔融し、パルプ繊維と接着固定されていることを特徴とする拭き布である。本発明の第二は、融点が異なる二成分の熱可塑性重合体からなる複合型長繊維不織布とパルプ繊維からなる紙シートを高圧水ジェット流により交絡一体化して複合不織布とし、次いで該不織布を加熱ロール間に通し、加熱と加圧を施した複合不織布からなる拭き布の製造方法において、該複合型長繊維は、熱可塑性重合体の第一成分がポリオレフィン系重合体で、第二成分が前記第一成分の融点より30℃以上高い融点を有する熱可塑性重合体からなり、該第一成分の融点以上で、且つ、第二成分の融点よりも15℃以上低い温度に設定した熱ロール間に前記複合不織布を導入して加熱と加圧処理することにより、第一成分のポリオレフィン系重合体のみを熔融させてパルプ繊維と接着固定することを特徴とする拭き布の製造方法である。

#### 【0007】

【発明の実施の形態】本発明の複合型長繊維に使用される第一成分のポリオレフィン系重合体としては、直鎖状低密度ポリエチレン、中密度ポリエチレン、高密度ポリエチレン等いわゆるポリエチレン重合体、ポリプロピレン重合体等を挙げることができ、これらの中から適宜選択して用いられる。又、第二成分の重合体としては第一成分の重合体の融点よりも30℃以上高い融点を有し、一般的に、長繊維紡糸用として市販されている公知の熱可塑性重合体であれば、特に限定されないが、ポリプロピレン重合体、ポリエステル系重合体、ポリアミド系重合体等を挙げることができ、これらの中から適宜選択して用いられる。複合型長繊維を熔融紡糸して得るに際しては、前記の第一成分と第二成分の熱可塑性樹脂へ、潤滑剤、顔料、安定剤、難燃剤、抗菌剤等を添加しても良い。本発明に用いられる複合型長繊維は、公知の複合紡糸装置を用いて製造することができ、サイドバイサイド（バイメタル）型、芯鞘型、及び海島型のいずれであっても良く、更に、このような複合型長繊維の断面形状は、円形のみでなく、三角形、四角形等の異形断面形状であっても良い。しかしながら、本発明では、芯鞘型で近似的に同心円構造を有するものが操業上の容易さと良好な繊維物性面から好適である。

【0008】更に、前記複合型長繊維の繊維軸に直交す

る繊維断面に占める第一成分の樹脂の比率は、全繊維重量当たり40～80重量%の範囲である。第一成分の樹脂の比率が40重量%未満では、複合型長繊維不織布と紙シートを構成するパルプ繊維とを高圧水ジェット流によって水交絡させた後に加熱処理を行っても、パルプ繊維に対して低融点の第一成分が少な過ぎて、十分な接着力が得られず、パルプ繊維を十分固定することができない。逆に、第一成分の樹脂の比率が80重量%を超えて大きくなると、熱溶融しない第二成分の樹脂が少ないために、加熱と加圧の処理を行う時に複合型長繊維の糸切れが発生し、拭き布としての繊維強度も弱くなり適さない。本発明に用いられる複合型長繊維は、公知の複合型繊維用の紡糸機より溶融押出し紡糸し、その紡出されたフィラメント群をエアサッカークからの高速エアーで引き取って、延伸、解繊して1～10デニールの範囲の織度に調整される。複合型長繊維の織度が1デニール未満では、複合型長繊維の製造条件が厳密になって、複合型長繊維、ひいては複合型長繊維不織布を高速で製造し難くなる。逆に、複合型長繊維の織度が10デニールを超えて大きくなると、得られる複合型長繊維不織布が硬くなり、結果的に、拭き布の柔軟性や風合いも低下し拭き布として適さない。

【0009】前記した複合型長繊維は、移動する金網製ベルトのような支持体上に捕集、堆積してウェブが形成される。この場合の複合型長繊維ウェブの坪量は、JIS P 8124による方法で測定し、10～40g/m<sup>2</sup>の範囲である。坪量が10g/m<sup>2</sup>未満では、複合型長繊維不織布の形態安定性が低下し、拭き布としての湿潤強度が低下する。その上、パルプ繊維と溶融接着する低融点の第一成分（ポリオレフィン系重合体）が少なくなるため、接着力が弱くなり、パルプ繊維を十分固定することができず、結果的に紙粉の発生が多い拭き布となり工業用ワイパーとして用いるには適さない。逆に、坪量が40g/m<sup>2</sup>を超えて大きくなると、長繊維不織布に紙シートを積層して、紙シート側から長繊維不織布側に向けて高圧水ジェット流を噴射して水交絡を施す際に、積層シートを支持する金網製の支持体の下に設けられているサクシジョンノズルによって長繊維不織布を通して、積層シートの表面に滞留する水を吸引除去する能力が低下するので、高圧水ジェット流を施そうとしても、該積層シートの表面に水溜まりが存在するために、十分な水交絡が得られず、複合不織布の地合も悪くなるので適さない。

【0010】金網製の支持体上に形成された複合型長繊維ウェブは、シートの形態保持とシート強度を付与する目的で、規則的な間隔で断続的に長繊維同士の自己融着を設けるため、いわゆるエンボス処理を行う。前記のようにして準備した長繊維不織布の上に、セルロースパルプ繊維を原料として湿式抄紙機で抄紙されて得られた紙シートを積層する。この紙シートとしては、以下に述べ

る抄紙機で抄紙し、乾燥した後のシートを使用することができる。紙シートの坪量は、JIS P 8124による方法で測定し、 $10 \sim 40 \text{ g/m}^2$ の範囲である。坪量が $10 \text{ g/m}^2$ 未満では、バルブ繊維の絶対量が少ないため、得られる拭き布には十分な吸液性能が付与されない。逆に、坪量が $40 \text{ g/m}^2$ を超えて大きくなると、バルブ繊維に対して複合型長繊維の低融点の第一成分が少な過ぎて、接着力が弱くバルブ繊維を十分固定することができず、結果的に紙粉の発生が多い拭き布となり工業用ワイパーとして用いるには適さない。

【0011】紙シートを構成するセルロースバルブ繊維としては、針葉樹又は広葉樹木材をクラフト法、サルファイト法、ソーダ法、ポリサルファイト法等の公知の蒸解法で蒸解して得られる未晒バルブ繊維又は必要に応じて未晒バルブ繊維を漂白して得られる晒バルブ繊維、或いは前記針葉樹木材からのグラウンドバルブ繊維、サーモメカニカルバルブ繊維等の機械バルブ繊維を、単独で、又は混合して使用することができる。この場合の針葉樹バルブ繊維と広葉樹バルブ繊維の重量配合比は、針葉樹バルブ繊維：広葉樹バルブ繊維が $100:0 \sim 20:80$ 、好ましくは $100:0 \sim 40:60$ の範囲である。広葉樹バルブ繊維が全バルブ繊維の80重量%を超えると、高圧水ジェット流による水交絡処理を施した際に、水ジェット流によるバルブ繊維の脱落が容易に生じ、バルブの消失量が増加するばかりでなく、水交絡後のシートの柔軟性が低下する。

【0012】本発明に用いられる前記紙シートのJIS P 8118による密度は、 $0.65 \text{ g/cm}^3$ 以下である。紙シートの密度が $0.65 \text{ g/cm}^3$ を超えると、紙シートの上から高圧水ジェット流を噴射した場合に、バルブ繊維が水ジェット流で離解し難くなり、繊維の運動が抑制されるので、不織布の長繊維とバルブ繊維の水交絡が不十分になり、複合不織布の柔軟性が低下する。しかしながら、紙シートの密度を小さくしようとしても限度があり、その下限はティッシュペーパーのように柔らかい状態の $0.20 \text{ g/cm}^3$ 程度である。紙シートは、通常前記バルブ繊維を含有するスラリーを用いて公知の湿式抄紙機において抄紙してドライヤーで乾燥した後得られるが、抄紙の際、例えば、ポリアミド・エビクロルヒドリン樹脂又はその変成物、ポリアミン・エビクロルヒドリン樹脂、メラミン樹脂、尿素樹脂等の湿潤紙力増強剤をスラリー中に添加しても良い。

【0013】この紙シートは、予め準備した長繊維不織布の上片面に積層されるが、この時にJIS P 8124による長繊維不織布の坪量と紙シートの坪量の絶乾重量比は、長繊維不織布：紙シートが $1:1 \sim 2:1$ となるように調整する。長繊維不織布：紙シートが $2:1$ を超えて紙シートの比が減少すると、長繊維の量に対して、相対的にバルブ繊維の量が少なくなり、拭き布としての吸液性能が低下するので適さない。又、高価な複合

型長繊維に対して、廉価なバルブ繊維の量が少なくなることによって、拭き布自体の製造コストが高くなる。逆に、長繊維不織布：紙シートが $1:1$ を超えて、紙シートの比が増加すると、紙シートを構成するバルブ繊維に対して複合型長繊維の低融点の第一成分が少なくなり、それによって接着力が弱くなり、バルブ繊維を十分固定することができず、結果的に紙粉の発生が多い拭き布となり適さない。

【0014】長繊維不織布の上片面に紙シートを積層し、積層体とした後、紙シートの表面から長繊維不織布側に向けて高圧水ジェット流を噴射する際には、積層体の紙シート側から長繊維不織布側へ高圧水ジェット流が貫通するようにして、高圧水ジェット流を噴射するのである。この高圧水ジェット流は、微細な孔径、例えば直径が $0.01 \sim 0.3 \text{ mm}$ のノズル孔を通して高い水圧、例えば、 $20 \sim 180 \text{ Kg/cm}^2$ の圧力で水を噴出させて得られるものである。この高圧水ジェット流を前記積層体に施すと、高圧水ジェット流は、まず紙シートに衝突して紙シートを長繊維不織布上に密着させ、次いでこの密着した状態で、紙シートの部分的な破壊が生じ、その部分の紙シートを構成するバルブ繊維を単離させ、バルブ繊維に曲げ、捩れ等の変形を起こさせると共に、バルブ繊維に運動エネルギーを十分に与え、ランダムな運動を生じさせる。その結果、これらの複合作用によって、バルブ繊維と長繊維不織布中の長繊維とが絡み合い、更に、長繊維同士も交絡することになるのである。

【0015】以上のようにして、バルブ繊維と複合型長繊維を交絡させた複合不織布シートを、複合型長繊維の第一成分のポリオレフィン系重合体の融点以上で、かつ、第二成分の重合体樹脂の融点よりも $15^\circ\text{C}$ 以上低い温度に設定した熱ロール間に導入し、加熱と加圧の処理するが、この処理は本発明の必須条件である。複合不織布シートを前記のように処理することにより、複合型長繊維の第一成分（ポリオレフィン系重合体）のみを溶融させ、それと同時に、加圧処理を行うことにより、複合型長繊維と交絡しているバルブ繊維に、溶融した該第一成分の重合体が拡散してバルブ繊維の一部を被覆し、結果的にバルブ繊維を固定することになる。熱ロールの温度が複合型長繊維の第二成分の融点より $15^\circ\text{C}$ 未満の低い温度に設定されていると、第一成分（ポリオレフィン系重合体）が溶融している上、第二成分の重合体も加圧下においては容易に軟化し又は溶融するので加熱と加圧の処理の間に複合不織布シートの強度が極めて弱くなり、破れや切断が生じるので適さない。

【0016】又、前記第二成分に重合体の融点より $15^\circ\text{C}$ 以上低い温度であっても、第一成分（ポリオレフィン系重合体）の融点より低い温度では、第一成分の溶融が生じないので適さない。複合不織布シートの加熱と加圧処理を行う熱ロールとしてはヒートプレスロールであれ

ばいずれのものを用いてもよく、例えば、スーパーカレンダーが好適に用いられる。又、使用するロールも特に限定するものではなく、弾性ロール、金属ロール、及び弾性ロールと金属ロールを複数組み合わせたもののいずれを用いても良い。熱ロールにおける処理に際し、複合不織布シートの通過時間、回数、ロール間の線圧等の条件は、複合型長繊維の第一成分であるポリオレフィン系重合体の融点と熱ロールにおける設定温度との温度差、複合不織布シートの複合型長繊維とバルブ繊維の比率等によって、吸液性能、耐溶剤性、紙粉発生量等をみながら適宜選択して決定される。

【0017】以上説明したように、本発明によれば、複合型合成長繊維とバルブ繊維が水交絡し、前記複合型長繊維の一部（低融点の第一成分）がバルブ繊維と熔融、接着して構成される複合不織布シートからなる拭き布が得られ、このような拭き布にはバルブ繊維の有する優れた吸液性能と合成繊維の有する優れた耐溶剤性が同時に付与されており、更に、合成高分子系接着剤やゴム系接着剤を全く使用せずに、ポリオレフィン系重合体によるバルブ繊維の固定が強固になされているので、優れた吸液性能と耐溶剤性を備え、紙粉発生の少ない拭き布を安価に製造することができる。

【0018】

【実施例】以下に実施例を挙げて本発明をより具体的に説明するが、本発明は勿論これらに限定されるものではない。尚、以下の実施例において、％は、特に断らない限り絶乾ベースの重量％である。

【0019】実施例1

融点が131.5℃の高密度ポリエチレンを第一成分とし、融点が163℃のポリプロピレンを第二成分に選定した後、第一成分を鞘成分とし、第二成分を芯成分とする複合芯鞘型長繊維を公知の押し出し紡糸機において芯鞘複合紡糸用口金を用い、第一成分と第二成分が250℃になるように加熱して溶融させ、多数の微細孔から押し出し、紡糸した後、紡出されたフィラメント群をエアースUCKAの高速エアードで引き取り、延伸して繊維度が3.0デニールの長繊維を形成し、移動するワイヤー製支持体上に捕集、堆積させ、ウェブを形成させた。この複合芯鞘型長繊維のウェブを120℃に加熱した凹凸ロールと平滑ロールの間に導入し、凹凸ロールの凸部に対応する部分を融着することによりJISP 8124による坪量20g/m<sup>2</sup>の長繊維不織布を得た。この長繊維不織布の表面に、針葉樹屑クラフトバルブ繊維を用いて公知の湿式抄紙機で抄紙して得られた乾燥紙シートを積層した。この紙シートのJISP 8118による密度は0.48g/cm<sup>3</sup>であった。この場合の長繊維不織布と紙シートの絶乾重量比は1:1であった。

【0020】次いで、紙シートが上に位置し、長繊維不織布が下に位置するようにして、支持体としての金網製

の移送コンベア上に載置し、この積載物を20m/分の速度で移送させながら、孔径0.12mmのノズル孔が1mm間隔で並んで設けてある高圧水ジェット流の噴出装置を用いて、40Kg/cm<sup>2</sup>の水圧で水ジェット流を噴出させ、紙シートの表面から長繊維不織布側に向けて前記水ジェット流を通過させた後、加熱乾燥して、紙シートを構成しているバルブ繊維と、長繊維不織布を構成している複合型長繊維とが水交絡して、両者が一体化された複合不織布シートを得た。この複合不織布シートを、温度が140℃に加熱され、二軸で線圧20kg/cmで加圧したプレスロール間へ導入、通過させて加熱と加圧処理を行い、複合不織布シートからなる拭き布を得た。得られた拭き布を下記の試験法により試験し、その品質を評価した。

【0021】試験法

(1) 柔軟性

拭き布の柔軟性を手触りによる官能で評価した。官能評価は、次の5段階評価で行った。

- 5・・・極めて柔軟であった。
- 4・・・柔軟であった。
- 3・・・柔軟性は普通であった。
- 2・・・柔軟性にやや劣っていた。
- 1・・・柔軟性に劣っていた。

(2) 吸水性

吸水性は、JIS L 1096の6.26.1滴下法に示された方法で測定した吸水速度で評価した。吸水性は、吸水速度が15秒以下であれば実用的に問題なく、優れていると評価した。

【0022】(3) 紙粉発生状況

紙粉発生状況は、拭き布をA4サイズの大きさに断裁し、これを書道用墨汁（黒墨、呉竹精昇堂社製）に浸漬後、絞らずに温度120℃の乾燥器内で5分間乾燥し、黒色に染色した拭き布を試料として準備した。次に、試料の紙粉の発生を試験し、紙シート側が表になる様にA4サイズの長い辺の中心で二つ折りにして短い辺の両端を両手で掴み、無風状態の室内に水平に置いた白紙の15cm上方で10往復手揉みした。白紙上に落ちた黒色の紙粉を目視による官能で評価した。試験は、紙シートを表にした場合3枚と長繊維不織布を表にした場合3枚についてそれぞれ行い、官能評価は、次の5段階で行った。得られた結果を小数転移か四捨五入した平均値で示した。

- 5・・・紙粉の発生量が極めて少ない。
- 4・・・紙粉の発生量が少ない。
- 3・・・紙粉の発生量が普通である。
- 2・・・紙粉の発生量がやや多い。
- 1・・・紙粉の発生量が著しく多い。

【0023】(4) 耐溶剤性

耐溶剤性は、拭き布を10cm×10cmの大きさに断裁した後、これを十分な量のアセトンに6時間浸漬した

後、拭き布を取り出し、軽く拭き布を絞って、アセトンの垂れが生じないようにした後、拭き布を紙シート側を表に二つ折りにし、試験片を用意した。次いで、ガラス板を準備し、その表面をアセトンに浸漬した拭き布で10往復擦り、ガラス板に付着した紙粉を目視による官能で評価し、官能評価は、次の5段階で行った。得られた結果を四捨五入した平均値で示した。5・・・紙粉の発生量が極めて少ない。

4・・・紙粉の発生量が少ない。

3・・・紙粉の発生量が普通である。

2・・・紙粉の発生量がやや多い。

1・・・紙粉の発生量が著しく多い。

#### 【0024】実施例2

融点が132℃の高密度ポリエチレンを第一成分とし、融点が267℃のポリエチレンテレフタレートを第二成分に選定した後、サイドバイサイド構造の複合型長繊維をサイドバイサイド複合紡糸用口金を用い、第一成分と第二成分が290℃になるように加熱して溶融させ、多数の微細孔から押し出し、紡糸した後、紡出されたフィラメント群をエジェクターにて引き取り、延伸して繊維2.8デニールの長繊維を形成し、移動するワイヤー製支持体上に捕集、堆積させ、ウェブを形成させた。この複合サイドバイサイド型長繊維のウェブを120℃に加熱した凹凸ロールと平滑ロールの間に導入し、凹凸ロールの凸部に対応する部分を融着することにより坪量30g/cm<sup>2</sup>の長繊維不織布を得た。この長繊維不織布の上に坪量が18g/m<sup>2</sup>で、密度が0.48g/cm<sup>3</sup>の紙シートを積層し、長繊維不織布と紙シートの絶乾重量比が1.7:1としたこと以外は、実施例1と同様にして複合不織布シートからなる拭き布を得た。得られた拭き布を前記の試験法により試験し、その品質を評価した。

#### 【0025】比較例1

融点が127.2℃の直鎖状低密度ポリエチレンを第一成分とし、融点が140℃のポリエチレンとポリプロピレンの共重合体を第二成分に選定し、第一成分を鞘成分とし、第二成分を芯成分として複合芯鞘型不織布を作製し、これを用いたこと以外は実施例1と同様にして複合不織布シートからなる拭き布を作製しようとしたが、プレスロールによる加熱と加圧の処理を行う際に、プレスロールにてシートの切断が発生し、拭き布を作製することができなかった。

#### 【0026】比較例2

プレスロールの加熱温度を160℃に設定したこと以外は、実施例1と同様にして複合不織布シートからなる拭き布を作製しようとしたが、プレスロールによる加熱と加圧の処理を行う際に、プレスロールにてシート切断が発生し、拭き布を作製することができなかった。

#### 【0027】比較例3

プレスロールの加熱温度を120℃に設定したこと以外

は、実施例2と同様にして複合不織布からなる拭き布を作製した。得られた拭き布を前記の試験法で試験し、その品質を評価した。

#### 【0028】比較例4

実施例2において得られた複合サイドバイサイド型長繊維不織布と紙シートとの高圧水ジェット流によって水交絡させ、加熱乾燥した複合不織布シートに、アクリルエマルジョン（商品番号：AE-948、日本合成ゴム社製）を含浸し、乾燥させて複合不織布シートからなる拭き布を作製した。この拭き布へのアクリルの固形分としての含有量は絶乾ベースで6g/m<sup>2</sup>であった。得られた拭き布を前記の試験法で試験し、その品質を評価した。

【0029】実施例及び比較例で得られた結果を表1に示した。

#### 【0030】

【表1】

	柔軟性	吸水性 (吸水速度、秒)	紙粉発生 状況	耐溶剤性
実施例1	5	8.0	4	4
実施例2	5	11.0	5	5
比較例1	複合不織布シート作製できず			
比較例2	複合不織布シート作製できず			
比較例3	5	1.0	1	1
比較例4	3	5.0	5	1

【0031】表1から明らかなように、本発明により得られる複合シートからなる拭き布は、柔軟性、吸水性、紙粉発生量、耐溶剤性等の性能が優れている（実施例1～2）。これに対し、複合型長繊維の第一成分と第二成分の融点差が30℃未満である場合（比較例1）や、複合型長繊維の第二成分の融点よりも15℃未満の低い温度にプレスロールの温度を設定した場合（比較例2）、加熱と加圧の処理を行うプレスロールにおいて複合不織布シートの切断が発生し、拭き布を作製することができなかった。又、プレスロールの設定温度が複合型長繊維の第一成分の融点よりも低い場合は、プレスロールにより加熱と加圧の処理を施しても、第一成分が溶融しないので第一成分の重合体によりバルブ繊維を固定することができず、このような複合不織布シートを拭き布として使用すると、紙粉発生量が多く、拭き布としては適していない（比較例3）。一方、バルブ繊維の固定方法としてアクリルエマルジョンを接着剤として用いた場合は、柔軟性、吸水性、紙粉発生量等は良好であるが、耐溶剤性が極めて劣り溶剤系のインキや油による汚れを溶剤を用いて除去するための拭き布としては使用で

きない(比較例4)。

【0032】

【発明の効果】本発明は、ポリオレフィン系重合体を溶\*

\*融させてバルブ繊維を接着固定したことを特徴とし、吸液性能と耐溶剤性が極めて優れ、紙粉発生の少ない拭き布及びその製造方法を提供するという効果を奏する。

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フロントページの続き

(72)発明者 鈴木 磨

東京都中央区日本橋浜町2丁目26番5号

滝沢ビル3F 株式会社日本吸収体技術研

究所内





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(71)Applicant : OJI PAPER CO LTD

NIPPON KYUSHUTAI GIJUTSU

KENKYUSHO:KK

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(72)Inventor : MIYOSHI TOMOJI

KUDO YOSUKE

SUZUKI MIGAKU

## (54) WIPING CLOTH AND ITS PRODUCTION

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To produce a wiping cloth that does not generate so much paper dust, etc., has excellent liquid-absorptive performance and solvent resistance, and is suitable to industrial wipers.

**SOLUTION:** This wiping cloth comprises a composite nonwoven fabric produced by water-confounding a composite-type long-fiber nonwoven fabric composed of two thermoplastic polymer components which have different melting points, and a paper sheets composed of pulp fibers, and further heating and pressing the confounding web through heating rolls. Particularly, the composite-type long-fiber fabric comprises a thermoplastic polymer whose first component is a polyolefin-based polymer and whose second component is a thermoplastic polymer having a melting point of at least 30° C higher than the melting point of the first component, and is heated and pressed at a temperature of at least 15° C lower than the melting point of the second component, so that the first component, polyolefin-based polymer only can fused, and bond the pulp fibers to fix on the webs.

## LEGAL STATUS

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[Claim(s)]

[Claim 1] The water confounding of the paper sheet which consists of a compound-die continuous glass fiber nonwoven fabric which consists of a thermoplastic polymer of two components with which the melting points differ, and pulp fiber is carried out by the high-pressure water-jet style. Further with a heating roller It consists of a compound nonwoven fabric with which heating and pressurization were given, wipes, and sets on cloth. This compound-die continuous glass fiber The first component of a thermoplastic polymer consists of a thermoplastic polymer which has the melting point with the second component higher 30 degrees C or more than the melting point of said first component with a polyolefine system polymer. Above the melting point of this first component And pressure treatment is carried out to heating at temperature lower 15 degrees C or more than the melting point of the second component, and only the polyolefine system polymer of the first component fuses, and it is characterized by carrying out adhesion immobilization with pulp fiber, wipes, and is cloth.

[Claim 2] Carry out the confounding unification of the paper sheet which consists of a compound-die continuous glass fiber nonwoven fabric which consists of a thermoplastic polymer of two components with which the melting points differ, and pulp fiber by the high-pressure water-jet style, and it considers as a compound nonwoven fabric. Between heating rollers, it consists of a compound nonwoven fabric which gave through, heating, and pressurization, this nonwoven fabric is wiped, and it sets to the manufacture approach of cloth. Subsequently, this compound-die continuous glass fiber The first component of a thermoplastic polymer consists of a thermoplastic polymer which has the melting point with the second component higher 30 degrees C or more than the melting point of said first component with a polyolefine system polymer. Above the melting point of this first component And by introducing said compound nonwoven fabric between the hot calender rolls set as temperature lower 15 degrees C or more than the melting point of the second component, and carrying out pressure treatment to heating, it is characterized by carrying out melting only of the polyolefine system polymer of the first component, and carrying out adhesion immobilization with pulp fiber, wipes, and is the manufacture approach of cloth.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] There is little omission fiber, it is used for an industrial use wiper, a waste, etc. excellent in absorbent ability and solvent resistance, wipes this invention, and it relates to cloth and its manufacturing method.

[0002]

[Description of the Prior Art] Conventionally, it wipes, and after cloth accumulates the dry type pulp sheet and rayon fiber which made the aqueous emulsion of the resin of synthetic macromolecule contain as adhesives, and dried it after [ which accumulated pulp fiber ] being used for an industrial use wiper, a waste, etc., the nonwoven fabric sheet which combined between rayon fibers with elastomeric adhesive is used as a base material. Generally, using an industrial use wiper, in the activity which wipes off the dirt by ink and an oil meltable to a solvent, since solvents, such as an acetone and ethyl acetate, are included in a wiper, the activity of wiping off an object is done. By transferring a solvent to the object which should be first removed by wiping, and dissolving and diluting dirt, this is performed in order to raise dirt omission nature.

[0003] However, since resin and elastomeric adhesive of synthetic macromolecule are used for the industrial use wiper using a dry type pulp sheet or a rayon nonwoven fabric sheet for fiber omission prevention, it has the problem that solvent resistance is very bad. That is, if permeate the adhesives used for omission prevention of a solvent of fiber, the swelling of adhesives arises, the fixing reinforcement of adhesives falls, consequently the fiber on the front face of a wiper is ground in case it is a wiping activity when a solvent is included in a dry type pulp sheet or a rayon nonwoven sheet, since omission of fiber will arise, such a thing is unsuitable as an industrial use wiper. On the other hand, the melting resin obtained with an elevated temperature and high-speed air near the nozzle is \*\*ized, and uptake and after being accumulated, the melt blow nonwoven fabric fixed by heat treatment like heat embossing is also used as a base material of an industrial use wiper, at the same time it fuses a polypropylene polymer and extrudes from a nozzle. In the case of this melt blow nonwoven fabric, melt spinning of the polyolefine polymer is carried out, and since embossing heat treatment is performing immobilization between fiber in addition to fiber itself having solvent resistance, the nonwoven fabric itself has sufficient solvent resistance.

[0004] However, itself is hydrophobicity, therefore the melt blow nonwoven fabric of a polyolefine polymer is also hydrophobicity. Therefore, even if it is going to wipe off the dirt of a drainage system with a melt blow nonwoven fabric, crawling arises and wiping is impossible. In order to improve this, it is made to contain, and it is usually used for it, carrying out hydrophilization of the surfactant of a hydrophilic property to a melt blow nonwoven fabric. For this reason, oleophilic [ with which the melt blow nonwoven fabric is originally equipped conversely ] fell, and the new fault that the wiping nature to the dirt of an oil system falls has arisen as a result.

[0005]

[Problem(s) to be Solved by the Invention] Then, in view of this background, this invention person etc. has little generating of paper powder etc., has sufficient absorbent ability and solvent

resistance collectively, and performed various examination about the sheet-like thing which can be suitably used as an industrial use wiper. Consequently, consist of thermoplastic polymers only with the specific range high [ the melting point ] from the melting point of the polyolefine system polymer as a low melting point component, and this polymer. The compound-die continuous glass fiber which consists of a thermoplastic polymer of two components with which the melting points differ on a base material Uptake, Deposited, formed the web and prepared the self welding section regular subsequently to this web, and intermittent. Carry out the laminating of the paper sheet which considered as the so-called span bond nonwoven fabric of compound-die continuous glass fiber, and used wood pulp as the raw material on this, and a high-pressure water-jet style is injected so that it may penetrate from on a paper sheet subsequently to said nonwoven fabric. After carrying out the water confounding of pulp fiber and the compound-die continuous glass fiber and considering as a compound nonwoven fabric sheet, Heating and pressurization are processed in the hot calender roll of temperature with which only the specific range made this compound nonwoven fabric sheet lower than the melting point of a high-melting thermoplastic polymer. Pulp fiber and the thing which made it fix by carrying out melting only of the polymer of the low melting point component of compound-die continuous glass fiber Even if it maintained the absorptivity ability which was excellent in pulp fiber and did not use adhesives, since it is carried out, it excels in solvent resistance, and immobilization of the pulp fiber by polyolefin resin came to complete header this invention for sufficient thing with little paper powder generating by omission of pulp fiber which it wipes and is acquired for cloth.

[0006]

[Means for Solving the Problem] The first of this invention, the water confounding of the paper sheet which consists of a compound-die continuous glass fiber nonwoven fabric which consists of a thermoplastic polymer of two components with which the melting points differ, and pulp fiber is carried out by the high-pressure water-jet style. Further with a heating roller It consists of a compound nonwoven fabric with which heating and pressurization were given, wipes, and sets on cloth. This compound-die continuous glass fiber The first component of a thermoplastic polymer consists of a thermoplastic polymer which has the melting point with the second component higher 30 degrees C or more than the melting point of said first component with a polyolefine system polymer. Above the melting point of this first component And pressure treatment is carried out to heating at temperature lower 15 degrees C or more than the melting point of the second component, and only the polyolefine system polymer of the first component fuses, and it is characterized by carrying out adhesion immobilization with pulp fiber, wipes, and is cloth. The second carries out the confounding unification of the paper sheet which consists of a compound-die continuous glass fiber nonwoven fabric which consists of a thermoplastic polymer of two components with which the melting points of this invention differ, and pulp fiber by the high-pressure water-jet style, and considers as a compound nonwoven fabric. Between heating rollers, it consists of a compound nonwoven fabric which gave through, heating, and pressurization, this nonwoven fabric is wiped, and it sets to the manufacture approach of cloth. Subsequently, this compound-die continuous glass fiber The first component of a thermoplastic polymer consists of a thermoplastic polymer which has the melting point with the second component higher 30 degrees C or more than the melting point of said first component with a polyolefine system polymer. Above the melting point of this first component And by introducing said compound nonwoven fabric between the hot calender rolls set as temperature lower 15 degrees C or more than the melting point of the second component, and carrying out pressure treatment to heating, it is characterized by carrying out melting only of the polyolefine system polymer of the first component, and carrying out adhesion immobilization with pulp fiber, wipes, and is the manufacture approach of cloth.

[0007]

[Embodiment of the Invention] As a polyolefine system polymer of the first component used for the compound-die continuous glass fiber of this invention, the so-called polyethylene polymer, such as straight chain-like low density polyethylene, medium density polyethylene, and high density polyethylene, a polypropylene polymer, etc. can be mentioned, and it chooses suitably from these and is used. Moreover, it has the melting point higher 30 degrees C or more than the

melting point of the polymer of the first component as a polymer of the second component, and a polypropylene polymer, a polyester system polymer, a polyamide system polymer, etc. can be mentioned, and although it will not be especially limited if it is the well-known thermoplastic polymer marketed as an object for continuous glass fiber spinning, generally, it chooses suitably from these and is used. It faces carrying out melt spinning of the compound-die continuous glass fiber, and obtaining, and lubricant, a pigment, a stabilizer, a flame retarder, an antimicrobial agent, etc. may be added to the thermoplastics of the first aforementioned component and the second component. The compound-die continuous glass fiber used for this invention can be manufactured using well-known compound spinning equipment, and you may be any of a side-by-side (bimetal) mold, a sheath-core mold, and a sea-island type, and still such a cross-section configuration of compound-die continuous glass fiber may not be a circular chisel, but may be variant cross-section configurations, such as a triangle and a square. However, what has a concentric ring structure in approximation with a sheath-core mold in this invention is suitable from the ease on operation, and a good fiber physical-properties side.

[0008] Furthermore, the ratio of the resin of the first component occupied in the fiber cross section which intersects perpendicularly with the fiber axis of said compound-die continuous glass fiber is 40 - 80% of the weight per total fiber weight of the range. Even if it heat-treats after carrying out the water confounding of the pulp fiber from which the ratio of the resin of the first component constitutes a compound-die continuous glass fiber nonwoven fabric and a paper sheet at less than 40 % of the weight by the high-pressure water-jet style, to pulp fiber, there are too few first components of the low melting point, sufficient adhesive strength is not obtained, and pulp fiber cannot be fixed enough. On the contrary, since there is little resin of the second component which does not carry out thermofusion when the ratio of the resin of the first component becomes large exceeding 80 % of the weight, when processing heating and pressurization, it generates, and the fiber reinforcement as cloth also becomes weak and it is not the thread breakage of compound-die continuous glass fiber wipes, and suitable [ thread breakage ]. From the well-known spinning machine for compound-die fiber, melting extrusion spinning of the compound-die continuous glass fiber used for this invention is carried out, it takes over and \*\*\*\* [ extend and ] the spun filament group in high-speed Ayr from air soccer, and is adjusted to the fineness of the range of 1-10 deniers. The manufacture conditions of compound-die continuous glass fiber become strict, and the fineness of compound-die continuous glass fiber stops easily being able to manufacture compound-die continuous glass fiber, as a result a compound-die continuous glass fiber nonwoven fabric in less than 1 denier at high speed. On the contrary, if the fineness of compound-die continuous glass fiber becomes large exceeding 10 deniers, it becomes hard, and as a result, the compound-die continuous glass fiber nonwoven fabric obtained wipes, and also falls and wipes the flexibility and aesthetic property of cloth, and it is not suitable [ nonwoven fabric ] as cloth.

[0009] a base material top like the belt made from a wire gauze which said compound-die continuous glass fiber carried out moves — uptake — it deposits and a web is formed. The basis weight of the compound-die continuous glass fiber web in this case is JISP. It measures by the approach by 8124 and is the range of 10 - 40 g/m<sup>2</sup>. The gestalt stability of a compound-die continuous glass fiber nonwoven fabric falls, a basis weight wipes with less than two 10 g/m, and the wet strength as cloth falls. since the first component (polyolefine system polymer) of the low melting point which carries out melting adhesion with pulp fiber moreover decreases, adhesive strength cannot become weak, and pulp fiber cannot be fixed enough, but there is much generating of paper powder as a result — it wipes and is not suitable for becoming cloth and using as an industrial use wiper. On the contrary, if a basis weight becomes large exceeding 40 g/m<sup>2</sup>, the laminating of the paper sheet will be carried out to a continuous glass fiber nonwoven fabric. In case a high-pressure water-jet style is injected towards a continuous glass fiber nonwoven fabric side from a paper sheet side and a water confounding is given, it lets a continuous glass fiber nonwoven fabric pass by the suction nozzle prepared in the bottom of the base material made from a wire gauze which supports a laminating sheet. Since the capacity which carries out suction removal of the water which piles up in the front face of a laminating sheet declines and a puddle exists in the front face of this laminating sheet even if it is going to

give a high-pressure water-jet style, sufficient water confounding is not obtained, and since the formation of a compound nonwoven fabric also worsens, it is not suitable.

[0010] The compound-die continuous glass fiber web formed on the base material made from a wire gauze is the purpose which gives gestalt maintenance and sheet reinforcement of a sheet, and it performs the so-called embossing processing in order to prepare the self welding of continuous glass fibers intermittently at regular spacing. On the continuous glass fiber nonwoven fabric which is the above, and was made and prepared, the laminating of the paper sheet which paper making was carried out and was obtained with the wet paper machine is carried out by using cellulose pulp fiber as a raw material. As this paper sheet, paper making can be carried out with the paper machine described below, and Ushiro's dry sheet can be used. The basis weight of a paper sheet is JIS. P It measures by the approach by 8124 and is the range of 10 - 40 g/m<sup>2</sup>. By less than two 10 g/m, since there is little absolute magnitude of pulp fiber, a basis weight is obtained, and it wipes, and sufficient absorbent ability is not given to cloth. on the contrary, when a basis weight becomes large exceeding 40 g/m<sup>2</sup>, there are [ for adhesive strength to fix pulp fiber enough weakly but ] too few first components of the low melting point of compound-die continuous glass fiber to pulp fiber, and there is much generating of paper powder as a result — it wipes and is not suitable for becoming cloth and using as an industrial use wiper.

[0011] It is independent, or mechanical pulp fiber, such as bleached pulp fiber which bleaches unbleached pulp fiber and is obtained if needed [ the unbleached pulp fiber or if needed ] which is acquired as cellulose pulp fiber which constitutes a paper sheet by carrying out digestion of a needle-leaf tree or the broad leaf tree material with well-known digester processes, such as a kraft process, the ape fight method, a soda process, and the poly ape fight method, or grand pulp fiber from said needle-leaf tree wood, and thermomechanical pulp fiber, can be mixed and used. the weight-mix ratio of the softwood pulp fiber in this case, and hardwood pulp fiber — softwood pulp fiber:hardwood pulp fiber — 100:0-20:80 — it is the range of 100:0-40:60 preferably. When hardwood pulp fiber exceeded 80% of the weight of all pulp fiber and \*\*\*\*\* processing by the high-pressure water-jet style is performed, the amount of disappearance of pulp not only increases, but omission of the pulp fiber by the water-jet style arise easily, and the flexibility of the sheet after \*\*\*\*\* falls.

[0012] JIS of said paper sheet used for this invention P The consistency by 8118 is three or less 0.65 g/cm. Since it will be hard coming to disaggregate pulp fiber by the water-jet style and movement of fiber will be controlled when a high-pressure water-jet style is injected from on a paper sheet if the consistency of a paper sheet exceeds 0.65 g/cm<sup>3</sup>, the water confounding of the continuous glass fiber of a nonwoven fabric and pulp fiber becomes inadequate, and the flexibility of a compound nonwoven fabric falls. However, even if it is going to make the consistency of a paper sheet small, it is limited, and the minimum is about three 0.20 g/cm of a soft condition like tissue paper. Although a paper sheet is obtained after carrying out paper making in a well-known wet paper machine using the slurry which usually contains said pulp fiber and drying with a dryer, it may add humid paper reinforcing agents, such as its conversion object in the case of paper making, for example, polyamide epichlorohydrin resin, polyamine epichlorohydrin resin, melamine resin, and a urea-resin, in a slurry.

[0013] This paper sheet is JIS at this time, although a laminating is carried out to upper one side of the continuous glass fiber nonwoven fabric prepared beforehand. The oven-dry-weight ratio of the basis weight of a continuous glass fiber nonwoven fabric and the basis weight of a paper sheet by P8124 is adjusted so that a continuous glass fiber nonwoven fabric:paper sheet may be set to 1:1-2:1. Continuous-glass-fiber nonwoven fabric: If paper sheets decrease in number [ the ratio of a paper sheet ] exceeding 2:1, since the amount of pulp fiber will decrease relatively, it will wipe to the amount of continuous glass fiber and the absorbent ability as cloth will fall, it is not suitable. Moreover, to expensive compound-die continuous glass fiber, when the amount of cheap pulp fiber decreases, it wipes and the manufacturing cost of the cloth itself becomes high. on the contrary, the first component of the low melting point of compound-die continuous glass fiber cannot decrease to the pulp fiber from which a continuous glass fiber nonwoven fabric:paper sheet constitutes a paper sheet if the ratio of a paper sheet increases exceeding 1:1, adhesive strength cannot become weak by it, and pulp fiber cannot be fixed enough, but

there is much generating of paper powder as a result — it wipes, and it becomes cloth and is not suitable.

[0014] In case a high-pressure water-jet style is injected towards a continuous glass fiber nonwoven fabric side from the front face of a paper sheet after carrying out the laminating of the paper sheet to upper one side of a continuous glass fiber nonwoven fabric and considering as a layered product, as a high-pressure water-jet style penetrates from the paper sheet side of a layered product to a continuous glass fiber nonwoven fabric side, a high-pressure water-jet style is injected. This high-pressure water-jet style is high water pressure, for example, the thing which 20–180kg/cm of water is made to blow off by the pressure of 2, and is obtained, through the nozzle hole whose detailed aperture, for example, a diameter, is 0.01–0.3mm. If this high-pressure water-jet style is given to said layered product, while a high-pressure water-jet style collides with a paper sheet first, sticks a paper sheet on a continuous glass fiber nonwoven fabric, being in this stuck condition subsequently, and partial destruction of a paper sheet arising, making the pulp fiber which constitutes the paper sheet of that part isolate and making pulp fiber cause deformation of bending, a twist, etc., kinetic energy will fully be given to pulp fiber, and random movement is produced. Consequently, according to these compound operations, pulp fiber and the continuous glass fiber in a continuous glass fiber nonwoven fabric will become entangled, and the confounding of the continuous glass fibers will be carried out further.

[0015] above — carrying out — pulp — fiber — a compound die — continuous glass fiber — a confounding — carrying out — having made — compound — a nonwoven fabric — a sheet — a compound die — continuous glass fiber — the — one — a component — polyolefine — a system — a polymer — the melting point — the above — it is — and — the — two — a component — a polymer — resin — the melting point — 15 — degree C — more than — being low — temperature — having set up — a hot calender roll — between — introducing — heating — pressurization — processing — although — this processing — the indispensable condition of this invention — it is . by processing a compound nonwoven fabric sheet as mentioned above, by carrying out melting only of the first component (polyolefine system polymer) of compound-die continuous glass fiber, and performing it, simultaneously pressure treatment, the polymer of this first fused component will diffuse for the pulp fiber which is carrying out the confounding to compound-die continuous glass fiber, a part of pulp fiber will be covered for it, and pulp fiber will be fixed to it as a result. If the temperature of a hot calender roll is set as the low temperature of less than 15 degrees C from the melting point of the second component of compound-die continuous glass fiber, when the first component (polyolefine system polymer) will fuse, since it softens easily or the polymer of the second component is also fused under pressurization, the reinforcement of a compound nonwoven fabric sheet becomes very weak between heating and processing of pressurization, and since a tear and cutting arise, it is not suitable.

[0016] Moreover, at temperature lower than the melting point of the first component (polyolefine system polymer), even if it is temperature lower 15 degrees C or more than the melting point of a polymer, since melting of the first component does not arise for said second component, it is not suitable for it. If it is a heat press roll as a hot calender roll which performs heating of a compound nonwoven fabric sheet and pressure treatment, which thing may be used, for example, a supercalender will be used suitably. Moreover, especially the roll to be used is not limited, either, and any may be used although two or more elastic rolls, metal rolls, and elastic rolls and metal rolls were combined. On the occasion of the processing in a hot calender roll, seeing absorbent ability, solvent resistance, a paper powder yield, etc., with the temperature gradient of the melting point of the polyolefine system polymer which is the first component of compound-die continuous glass fiber, and the laying temperature in a hot calender roll, the ratio of the compound-die continuous glass fiber of a compound nonwoven fabric sheet, and pulp fiber, etc., it chooses suitably and conditions, such as a linear pressure between the pass time of a compound nonwoven fabric sheet, a count, and a roll, are determined.

[0017] As explained above, according to this invention, compound-die composition continuous glass fiber and pulp fiber carry out a water confounding. Said some of compound-die continuous glass fibers (the first component of the low melting point) Pulp fiber and melting, Wipe, cloth is obtained and the outstanding solvent resistance which consists of a compound nonwoven fabric

sheet constituted by pasting up and which such outstanding absorbent ability that is wiped and pulp fiber has on cloth, and a synthetic fiber have is given to coincidence. furthermore, since immobilization of the pulp fiber by the polyolefine system polymer is made firmly, without using synthetic macromolecule system adhesives and elastomeric adhesive at all, it has the outstanding absorbent ability and solvent resistance, and there is little paper powder generating — it can wipe and cloth can be manufactured cheaply.

[0018]

[Example] Although an example is given to below and this invention is more concretely explained to it, of course, this invention is not limited to these. In addition, in the following examples, especially % is weight [ of the bone-dry base ] %, unless it refuses.

[0019] Set the compound sheath-core mold continuous glass fiber which uses the first component as a sheath component and uses the second component as a heart component to a well-known extrusion spinning machine after using as the first component the high density polyethylene whose example 1 melting point is 131.5 degrees C and selecting the polypropylene whose melting point is 163 degrees C for the second component. the object for sheath-core compound spinning — the base material top made from a wire which is made to heat and carry out melting using a mouthpiece so that the first component and the second component may become 250 degrees C, extrudes from much micropores, takes over and extends the spun filament group in high-speed Ayr of the Ayr soccer, forms the continuous glass fiber whose fineness is 3.0 deniers, and moves after carrying out spinning — uptake — it was made to deposit and the web was made to form It is JISP by introducing between the concavo-convex roll which heated the web of this compound sheath-core mold continuous glass fiber at 120 degrees C, and a smooth roll, and welding the part corresponding to the heights of a concavo-convex roll. The continuous glass fiber nonwoven fabric of basis-weight 20 g/m<sup>2</sup> by 8124 was obtained. Needle-leaved-tree-bleached-kraft-pulp fiber was used for the front face of this continuous glass fiber nonwoven fabric, and the laminating of the desiccation paper sheet obtained by carrying out paper making with the well-known wet paper machine was carried out. JIS of this paper sheet The basis weight by P8124 is 20 g/m<sup>2</sup> and JIS. P The consistencies by 8118 were 0.48 g/cm<sup>3</sup>. The oven-dry-weight ratio of the continuous glass fiber nonwoven fabric in this case and a paper sheet was 1:1.

[0020] While rank second and a paper sheet is located upwards, laying on the migration conveyor made from the wire gauze as a base material as a continuous glass fiber nonwoven fabric is located downward, and making this loading object transport the rate for 20m/, Blow off of a high-pressure water-jet style with which the nozzle hole of 0.12mm of apertures is located in a line at intervals of 1mm, and is prepared is used. Stoving is carried out, after making a water-jet style blow off with the water pressure of 40 kg/cm<sup>2</sup> and passing said water-jet style towards a continuous glass fiber nonwoven fabric side from the front face of a paper sheet. The pulp fiber which constitutes the paper sheet, and the compound-die continuous glass fiber which constitutes the continuous glass fiber nonwoven fabric carried out the water confounding, and the compound nonwoven fabric sheet with which both were unified was obtained. It was made to introduce and pass to between the press rolls which temperature was heated by 140 degrees C and pressurized this compound nonwoven fabric sheet by linear pressure 20 kg/cm with two shafts, and heating and pressure treatment were performed, and it consisted of a compound nonwoven fabric sheet, and wiped, and cloth was obtained. It obtained and wiped, cloth was examined by the following examining method, and the quality was evaluated.

[0021] The organic functions by the feel estimated the flexibility of the examining method (1) flexibility ~~\*\*\*\*~~. Organic-functions evaluation was performed by the next five-step evaluation.

5 ... It was very flexible.

4 ... It was flexible.

3 ... Flexibility was common.

2 ... A little inferior to flexibility.

1 ... Inferior to flexibility.

(2) Absorptivity absorptivity is JIS. L It evaluated at the water absorption rate measured by the approach shown in 6.26.1 dropping tests of 1096. It was estimated that absorptivity was



excellent satisfactory practical if a water absorption rate is 15 or less seconds.

[0022] (3) the paper powder generating situation paper powder generating situation was wiped, cut out cloth in the magnitude of A4 size, dried this for 5 minutes within the oven with a temperature of 120 degrees C, without extracting after being immersed in the india ink for calligraphy (\*\*\*\*, KURETAKE CO., LTD. make), and dyed it black — it wiped and cloth was prepared as a sample. Next, generating of the paper powder of a sample was examined, and it was made double fold at the core of the side where A4 size is long, and the both ends of the short side have been held with both hands so that a paper sheet side may become a table, and 10 round-trip \*\*\*\*\* was carried out in 15cm upper part of the blank paper placed at a level with the calm interior of a room. The organic functions by viewing estimated the black paper powder which fell on the blank paper. The trial was performed about three sheets, respectively, when a paper sheet was made into a table and a continuous glass fiber nonwoven fabric was carried out to three sheets in a table, and organic-functions evaluation was performed in the following five steps. Decimal transition or the rounded-off average showed the obtained result.

- 5 ... There are very few yields of paper powder.
- 4 ... There are few yields of paper powder.
- 3 ... The yield of paper powder is common.
- 2 ... There are a little many yields of paper powder.
- 1 ... There are many yields of paper powder remarkably.

[0023] (4) After wiping this after being immersed in sufficient quantity of an acetone for 6 hours after wiping and cutting out cloth in 10cmx10cm magnitude, taking out cloth, wiping lightly, extracting cloth and making it the lappet of an acetone not arise, solvent-resistance solvent resistance was wiped, folded the paper sheet side in two for cloth in the table, and prepared the test piece. Subsequently, the glass plate was prepared, the organic functions by viewing estimated the paper powder which was immersed in the acetone and which wiped and adhered to 10 round-trip grinding and a glass plate with cloth, and organic-functions evaluation performed the front face in the following five steps. The average which rounded off the obtained result showed.

- 5 ... There are very few yields of paper powder.
- 4 ... There are few yields of paper powder.
- 3 ... The yield of paper powder is common.
- 2 ... There are a little many yields of paper powder.
- 1 ... There are many yields of paper powder remarkably.

[0024] the compound-die continuous glass fiber of the side-by-side structure after using as the first component the high density polyethylene whose example 2 melting point is 132 degrees C and selecting the polyethylene terephthalate whose melting point is 267 degrees C for the second component — the object for side-by-side compound spinning — the first component and the second component become 290 degrees C using a mouthpiece — as — heating the base material top made from a wire which is made to carry out melting, extrudes from much micropores, takes over and extends the spun filament group with ejector mechanism, forms continuous glass fiber with a fineness of 2.8 deniers, and moves after carrying out spinning — uptake — it was made to deposit and the web was made to form It introduced between the concavo-convex roll which heated the web of this compound side-by-side mold continuous glass fiber at 120 degrees C, and the smooth roll, and the continuous glass fiber nonwoven fabric of basis-weight 30 g/cm<sup>2</sup> was obtained by welding the part corresponding to the heights of a concavo-convex roll. On this continuous glass fiber nonwoven fabric, except the consistency having carried out [ the basis weight ] the laminating of the 0.48g /of the paper sheets of 3 cm by 18 g/m<sup>2</sup>, and the oven-dry-weight ratio of a continuous glass fiber nonwoven fabric and a paper sheet having set to 1.7:1, it consisted of a compound nonwoven fabric sheet like the example 1, and wiped, and cloth was obtained. It obtained and wiped, cloth was examined by the aforementioned examining method, and the quality was evaluated.

[0025] Use as the first component the straight chain-like low density polyethylene whose example of comparison 1 melting point is 127.2 degrees C, select the copolymer of the polyethylene whose melting point is 140 degrees C, and polypropylene for the second component, use the first component as a sheath component, and let the second component be a

heart component. The compound sheath-core mold nonwoven fabric was produced, other than having used this, when processing heating by the press roll which consists of a compound nonwoven fabric sheet like an example 1 although it was going to wipe and was going to produce cloth, and pressurization, cutting of a sheet was able to occur, and was not able to wipe with a press roll, and cloth was not able to be produced.

[0026] Other than having set the heating temperature of example of comparison 2 press roll as 160 degrees C, when processing heating by the press roll which consists of a compound nonwoven fabric sheet like an example 1 although it was going to wipe and was going to produce cloth, and pressurization, sheet cutting was able to occur, and was not able to wipe with a press roll, and cloth was not able to be produced.

[0027] Except having set the heating temperature of example of comparison 3 press roll as 120 degrees C, it consisted of a compound nonwoven fabric like the example 2, and wiped, and cloth was produced. It obtained and wiped, cloth was examined by the aforementioned examining method, and the quality was evaluated.

[0028] Sink into the compound nonwoven fabric sheet which was made to carry out a water confounding and carried out stoving by the high-pressure water-jet style of the compound side-by-side mold continuous glass fiber nonwoven fabric and paper sheet which were obtained in example of comparison 4 example 2, and it was made to dry an acrylic emulsion (quotient lot-number number: AE-948, Japan Synthetic Rubber Co., Ltd. make), and it consisted of a compound nonwoven fabric sheet, and wiped, and cloth was produced. This content as solid content of the acrylic which it wipes and is in cloth was 6 g/m<sup>2</sup> with the bone-dry base. It obtained and wiped, cloth was examined by the aforementioned examining method, and the quality was evaluated.

[0029] The result obtained in the example and the example of a comparison was shown in Table 1.

[0030]

[Table 1]

	柔軟性	吸水性 (吸水速度、秒)	紙粉発生 状況	耐溶剤性
実施例 1	5	8.0	4	4
実施例 2	5	11.0	5	5
比較例 1	複合不織布シート作製できず			
比較例 2	複合不織布シート作製できず			
比較例 3	5	1.0	1	1
比較例 4	3	5.0	5	1

[0031] It consists of a compound sheet obtained by this invention, and wipes, and cloth is excellent in engine performance, such as flexibility, absorptivity, a paper powder yield, and solvent resistance, so that clearly from Table 1 (examples 1-2). On the other hand, when the melting point difference of the first component of compound-die continuous glass fiber and the second component was less than 30 degrees C (example 1 of a comparison), or when the temperature of a press roll was set as the low temperature of less than 15 degrees C rather than the melting point of the second component of compound-die continuous glass fiber (example 2 of a comparison), in the press roll which processes heating and pressurization, it generated, and cutting of a compound nonwoven fabric sheet was not able to wipe and was not able to produce cloth. Moreover, if pulp fiber cannot be fixed with the polymer of the first component, but such a compound nonwoven fabric sheet is wiped and it is used as cloth since the first component does not fuse even if it processes heating and pressurization with a press

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